

WHAT IS CLAIMED IS:

1. A processing apparatus comprising:
a sealed vacuum chamber which contains a processing portion;
a pressure controlling system which keeps the internal pressure of said sealed vacuum chamber constant at a predetermined level by exhausting the ambient gas in said sealed vacuum chamber; and
an ambience gas recirculating system which recirculates the ambience gas exhausted from said sealed vacuum chamber back into said sealed vacuum chamber;
wherein the ambience gas recirculated by said ambience gas recirculating system is blown into said sealed vacuum chamber so that a gas flow is generated in a predetermined direction along the said processing portion.
2. A processing apparatus according to Claim 1, wherein the ambient gas in said sealed vacuum chamber is exhausted by a pump or a compressor.
3. A processing apparatus according to Claim 1, wherein the ambience gas recirculated by said ambience gas recirculating system is blown into said sealed vacuum chamber through an intake orifice disposed in the top portion of said sealed vacuum chamber, so that a downward gas flow is generated toward an exhaust orifice disposed in the bottom portion of said sealed vacuum chamber.
4. A processing apparatus according to Claim 1, wherein the ambience gas recirculated by said ambience gas recirculating system is blown into said sealed vacuum chamber, toward the light path of the laser interferometry based measuring device disposed in said sealed vacuum chamber.
5. A processing apparatus according to Claim 1, wherein a certain portion of the ambience gas recirculated by said ambience gas recirculating system is blown into said sealed vacuum chamber through the intake orifice disposed in the top

portion of said sealed vacuum chamber, so that a downward gas flow is generated toward an exhaust orifice disposed in the bottom portion of said sealed vacuum chamber, while the rest of the gas recirculated by said gas recirculating system is blown into said vacuum chamber, toward the light path of the laser interferometry based measuring device disposed in said sealed vacuum chamber.

6. A processing apparatus according to Claim 1, wherein said ambience gas recirculating system is provided with a chemical filter, which is located where the ambient pressure is equal to, or greater than, the atmospheric air pressure.

7. A processing apparatus according to Claim 1, wherein said ambience gas recirculating system is provided with a temperature control portion for adjusting the temperature of the ambience gas.

8. A processing apparatus according to Claim 7, wherein a sensor for measuring the temperature of the ambience gas is disposed at the intake orifice, and said temperature control portion is controlled in response to the results of the measurement by said sensor.

9. A processing apparatus according to Claim 1, wherein a portion of said ambience gas recirculating system which exhausts the ambience gas in said sealed vacuum chamber is constituted of two ambience gas recirculating branches, and a valve for controlling the ambience gas flow rate is connected into the branch with the smaller flow rate.

10. A processing apparatus according to Claim 1, wherein the processing portion contained in said sealed vacuum chamber is an exposing apparatus for substrate exposure.

11. A processing apparatus comprising:
 - a sealed vacuum chamber which contains a processing portion; and
 - an ambience gas recirculating system which exhausts the ambience gas in said sealed vacuum chamber, increases the pressure of the exhausted gas, and recirculates it into said vacuum chamber, with the use of a compressor or a pump; wherein the ambience gas recirculated by said ambience gas recirculating system is blown into said sealed vacuum chamber so that a gas flow is generated in a predetermined direction, adjacent to the said processing portion.
12. A processing apparatus according to Claim 11, wherein the ambience gas recirculated by said ambience gas recirculating system is blown into said sealed vacuum chamber through an intake orifice disposed in the top portion of said sealed vacuum chamber, so that a downward gas flow is generated toward an exhaust orifice disposed in the bottom portion of said sealed vacuum chamber.
13. A processing apparatus according to Claim 11, wherein the ambience gas recirculated by said ambience gas recirculating system is blow into said sealed vacuum chamber, toward the light path of the laser interferometry based measuring device disposed in said sealed vacuum chamber.
14. A processing apparatus according to Claim 11, wherein a certain portion of the ambience gas recirculated by said ambience gas recirculating system is blown into said sealed vacuum chamber through the intake orifice disposed in the top portion of said sealed vacuum chamber, so that a downward gas flow is generated toward an exhaust orifice disposed in the bottom portion of said sealed vacuum chamber, while the rest of the gas recirculated by said gas recirculating system is blown into said vacuum chamber, toward the light path of the laser interferometry based measuring device disposed in said sealed vacuum chamber.

15. A processing apparatus according to Claim 11, wherein said ambience gas recirculating system is provided with a chemical filter, which is located where the ambient pressure is equal to, or greater than, the atmospheric air pressure.

16. A processing apparatus according to Claim 11, wherein said ambience gas recirculating system is provided with a temperature control portion for adjusting the temperature of the ambience gas.

17. A processing apparatus according to Claim 16, wherein a sensor for measuring the temperature of the ambience gas is disposed at the intake orifice, and said temperature control portion is controlled in response to the results of the measurement by said sensor.

18. A processing apparatus according to Claim 11, wherein a portion of said ambience gas recirculating system which exhausts the ambience gas in said sealed vacuum chamber is constituted of two ambience gas recirculating branches, and a valve for controlling the ambience gas flow rate is connected into the branch with the smaller flow rate.

19. A processing apparatus according to Claim 11, wherein the processing portion contained in said sealed vacuum chamber is an exposing apparatus for substrate exposure.

20. A processing apparatus comprising:
a sealed vacuum chamber which contains a processing portion;
a pressure controlling system which keeps the internal pressure of said sealed vacuum chamber constant at a predetermined level by exhausting the ambient gas in said sealed vacuum chamber;
an ambience gas recirculating system which increases the pressure of the ambience gas exhausted from said sealed vacuum chamber, and recirculates this

exhausted ambience gas with the increased pressure into said sealed vacuum chamber; and

an ambience gas supplying device for adding ambience gas to said sealed vacuum chamber.

21. A processing apparatus according to Claim 20, wherein said pressure controlling system comprises:

a valve for controlling the flow rate of the ambience gas;

a pump or a compressor;

a pressure sensor for detecting the internal pressure of said vacuum chamber; and

a controller which controls said ambience gas flow rate control valve in response to the results of the measurement by said pressure sensor.

22. A processing apparatus according to Claim 20, wherein said ambience gas recirculating system comprises:

a tank for storing the ambience gas exhausted by said pump or compressor; and

a flow rate control portion or a regulator for recirculating the ambience gas stored in said tank, into said sealed vacuum chamber.

23. A processing apparatus according to Claim 20, wherein said ambience gas recirculating system is provided with a chemical filter, which is located where the ambient pressure is equal to, or greater than, the atmospheric air pressure.

24. A processing apparatus according to Claim 20, wherein said ambience gas recirculating system is provided with a temperature control portion for adjusting the temperature of the ambience gas.

25. A processing apparatus according to claim 24, wherein a sensor for measuring the temperature of the ambience gas is disposed at the intake orifice,

and said temperature control portion is controlled in response to the results of the measurement by said sensor.

26. A processing apparatus according to Claim 20, wherein a portion of said ambience gas recirculating system which exhausts the ambience gas in said sealed vacuum chamber is constituted of two ambience gas recirculating branches, and a valve for controlling the ambience gas flow rate is connected into the branch with the smaller flow rate.

27. A processing apparatus according to Claim 20, wherein the processing portion contained in said sealed vacuum chamber is an exposing apparatus for substrate exposure.

28. A processing apparatus comprising:
a sealed vacuum chamber which contains a processing portion;
a pressure controlling system which keeps the internal pressure of said sealed vacuum chamber constant at a predetermined level by exhausting the ambient gas in said sealed vacuum chamber; and
an ambience gas recirculating system which recirculates the ambience gas exhausted from said sealed vacuum chamber, back into said sealed vacuum chamber; and
a high pressure ambience gas recirculating system which increases the pressure of the ambience gas exhausted from said sealed vacuum chamber, and recirculates this ambience gas with the increased pressure into said sealed vacuum chamber.

29. A processing apparatus according to Claim 28 comprising an ambience gas supply system for adding ambience gas to said sealed vacuum chamber.

30. A processing apparatus according to Claim 28, wherein said pressure controlling system comprises:

a valve for controlling the flow rate of the ambience gas;
a pump or a compressor;
a pressure sensor for detecting the internal pressure of said vacuum chamber; and
a controller which controls said ambience gas flow rate control valve in response to the results of the measurement by said pressure sensor.

31. A processing apparatus according to Claim 28,
wherein said ambience gas recirculating system comprises a tank for storing the ambience gas exhausted by said pump or compressor, and a flow rate control portion, and recirculates the ambience gas stored in said tank into said sealed vacuum chamber at a predetermined flow rate through said flow rate control portion; and

wherein said high pressure ambience gas recirculating system comprises: a high pressure tank for storing the ambience gas exhausted by said pump or compressor and then highly compressed; and a regulator which recirculates the high pressure ambience gas to said sealed vacuum chamber while allowing the gas to decompress.

32. A processing apparatus according to Claim 31, wherein said ambience gas recirculating system comprises a control valve which controls the gas flow rate of said ambience gas recirculating system in response to the results of the measurement of a pressure sensor for measuring the internal pressure of said tank in said ambience gas recirculating system.

33. A process apparatus according to Claim 32, wherein said control valve adds ambience gas to said tank, or suctions out the ambience gas in said tank.

34. A processing apparatus according to Claim 28, wherein a pump for activating a suction chuck contained in said sealed vacuum chamber is connected to said ambience gas recirculating system.

35. A processing apparatus according to Claim 28, wherein at least said ambience gas recirculating system or high pressure ambience gas recirculating system, or both, are provided with a chemical filter, which is located where the ambient pressure is equal to, or greater than, the atmospheric air pressure.

36. A processing apparatus according to Claim 28, wherein at least said ambience gas recirculating system or high pressure ambience gas recirculating system is provided with a temperature control portion for adjusting the temperature of the ambience gas.

39. A processing apparatus according to Claim 36, wherein a sensor for measuring the temperature of the ambience gas is disposed at the intake orifice, and said temperature control portion is controlled in response to the results of the measurement by said sensor.

38. A processing apparatus according to Claim 28, wherein a portion of said ambience gas recirculating system which exhausts the ambience gas in said sealed vacuum chamber is constituted of two ambience gas recirculating branches, and a valve for controlling the ambience gas flow rate is connected into the branch with the smaller flow rate.

39. A processing apparatus according to Claim 28, wherein the processing portion contained in said sealed vacuum chamber is an exposing apparatus for substrate exposure.

40. A processing apparatus comprising:
a sealed vacuum chamber which contains a processing portion;
a pressure controlling system which keeps the internal pressure of said sealed vacuum chamber constant at a predetermined level by exhausting the ambient gas in said sealed vacuum chamber;

an ambience gas recirculating system which recirculates the ambience gas exhausted from said sealed vacuum chamber back into said sealed vacuum chamber; and

a high pressure ambience gas recirculating system which increases the ambience gas exhausted from said sealed vacuum chamber, and recirculates this ambience gas with the high pressure into said sealed vacuum chamber;

wherein before said processing apparatus is stopped, at least a portion of the ambience gas is stored in at least said ambience gas recirculating system or high pressure ambience gas recirculating system, or both.

41. A processing apparatus according to Claim 40 comprising an ambience gas supplying system for adding ambience gas to said sealed vacuum chamber.

42. A processing apparatus according to Claim 40, wherein said pressure controlling system comprises:

a valve for controlling the flow rate of the ambience gas;

a pump or a compressor;

a pressure sensor for detecting the internal pressure of said vacuum chamber; and

a controller which controls said ambience gas flow rate control valve in response to the results of the measurement by said pressure sensor.

43. A processing apparatus according to Claim 40,

wherein said ambience gas recirculating system comprises a tank for storing the ambience gas exhausted by said pump or compressor, and a flow rate control portion, and recirculates the ambience gas stored in said tank into said sealed vacuum chamber at a predetermined flow rate through said flow rate control portion; and

wherein said high pressure ambience gas recirculating system comprises:

a high pressure tank for storing the ambience gas exhausted by said pump or compressor and then highly compressed; and a regulator which recirculates the

high pressure ambience gas to said sealed vacuum chamber while allowing the gas to decompress.

44. A processing apparatus according to Claim 43, wherein a valve is placed on both the upstream and downstream sides of at least said tank or high pressure tank, or both.

45. A processing apparatus according to Claim 44, wherein when said processing apparatus is stopped; said valve on the downstream side of the tank is closed, the ambience gas is sent into the tank by activating said pump or compressor; and then, said valve on the upstream side of the tank is closed to keep the ambience gas stored in the tank.

46. A processing apparatus according to Claim 40, wherein at least said ambience gas recirculating system or high pressure ambience gas recirculating system, or both, are provided with a bypass to said sealed vacuum chamber.

47. A processing apparatus according to Claim 46, wherein when said processing apparatus is stopped, said recirculating system is opened to said bypass, and the ambience gas is stored in said recirculating system and bypass.

48. A processing apparatus according to Claim 40, wherein at least said ambience gas recirculating system or high pressure ambience gas recirculating system, or both, are provided with a chemical filter, which is located where the ambient pressure is equal to, or greater than, the atmospheric air pressure.

49. A processing apparatus according to Claim 40, wherein at least said ambience gas recirculating system or high pressure ambience gas recirculating system, or both, are provided with a temperature control portion for adjusting the temperature of the ambience gas.

50. A processing apparatus according to Claim 49, wherein a sensor for measuring the temperature of the ambience gas is disposed at the intake orifice, and said temperature control portion is controlled in response to the results of the measurement by said sensor.

51. A processing apparatus according to Claim 40, wherein a portion of said ambience gas recirculating system which exhausts the ambience gas in said sealed vacuum chamber is constituted of two ambience gas recirculating branches, and a valve for controlling the ambience gas flow rate is connected into the branch with the smaller flow rate.

52. A processing apparatus according to Claim 40, wherein the processing portion contained in said sealed vacuum chamber is an exposing apparatus for substrate exposure.

53. A processing apparatus comprising:
a sealed vacuum chamber which contains a measuring portion; and
an ambience gas recirculating system which exhausts the ambience gas in said sealed vacuum chamber, increases the pressure of the exhausted ambience gas, and recirculates the exhausted ambience gas with the higher pressure back into said sealed vacuum chamber, with the use of a compressor or a pump
wherein the ambience gas recirculated by said recirculating system is blown into said sealed vacuum chamber so that a gas flow is generated in a predetermined direction, adjacent to said measuring portion.

54. A processing apparatus according to Claim 53, wherein said recirculating system is provided with a chemical filter, which is located where the ambient pressure is equal to, or greater than, the atmospheric air pressure.

55. A device manufacturing method for manufacturing a device with the use of said processing apparatus disclosed in Claim 1.

56. A device manufacturing method for manufacturing a device with the use of said processing apparatus disclosed in Claim 11.

57. A device manufacturing method for manufacturing a device with the use of said processing apparatus disclosed in Claim 20.

58. A device manufacturing method for manufacturing a device with the use of said processing apparatus disclosed in Claim 28.

59. A device manufacturing method for manufacturing a device with the use of said processing apparatus disclosed in Claim 40.